We claim:

1. A trench capacitor, comprising:

a substrate formed with a trench;

said trench having an upper region and a lower region;

an insulation collar formed in said upper region;

a buried well formed in said substrate, said lower region at least partly extending through said buried well;

a dielectric layer of tungsten oxide for lining said lower region, said dielectric layer serving as a capacitor dielectric; and

a conductive trench filling disposed in said trench.

2. The trench capacitor according to claim 1, wherein said conductive trench filling is a tungsten-containing material.

3. The trench capacitor according to claim 1, wherein said dielectric layer has a dielectric constant greater than 50.

4. The trench capacitor according to claim 1, including a barrier layer disposed between said dielectric layer and said substrate.

5. The trench capacitor according to claim 1, including a barrier layer disposed between said dielectric layer and said conductive trench filling.

6. The trench capacitor according to claim 1, including:

a barrier layer disposed between said dielectric layer and said substrate; and

a further barrier layer disposed between said dielectric layer and said conductive trench filling.

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7. The trench capacitor according to claim 4, wherein said barrier layer is formed of a material selected from the group consisting of silicon oxide, silicon nitride, oxynitride, tungsten nitride, titanium nitride, and tantalum nitride.

8. The trench capacitor according to claim 5, wherein said barrier layer is formed of a material selected from the group consisting of silicon oxide, silicon nitride, oxynitride, tungsten nitride, titanium nitride, and tantalum nitride.

9. The trench capacitor according to claim 1, including a vertical transistor disposed in said trench.

10. A method of producing a trench capacitor, the method which comprises:

introducing a buried well into a substrate;

forming a trench in the substrate, the trench having an upper region and a lower region;

forming an insulation collar in the upper region;

providing a capacitor dielectric by forming a dielectric layer of tungsten oxide lining the lower region; and

filling the trench with a conductive trench filling for providing an inner capacitor electrode.

11. The method according to claim 10, which comprises forming the dielectric layer by oxidizing a tungsten-containing layer.

12. The method according to claim 11, which comprises forming the tungsten-containing layer from a material selected from the group consisting of tungsten nitride, tungsten silicide, and pure tungsten.

13. The method according to claim 10, which comprises forming the dielectric layer by oxidizing a tungsten-containing layer at a temperature between 200°C and 600°C in an atmosphere containing at least one element selected from the group consisting of O_2, H_2O, N_2O, and NO.

14. The method according to claim 10, which comprises forming the dielectric layer by a reactive sputtering of tungsten in an oxygen-containing atmosphere.

15. The method according to claim 10, which comprises forming the dielectric layer as a layer with a dielectric constant greater than 50.

16. The method according to claim 10, which comprises subjecting the dielectric layer to a thermal treatment at a temperature between 550°C and 1100°C for providing the dielectric layer with a dielectric constant greater than 50.

17. The method according to claim 10, which comprises forming the conductive trench filling from a tungsten-containing material.

18. The method according to claim 10, which comprises forming a tungsten-containing layer by carrying out a selective

chemical vapor deposition process at a temperature between 200°C and 400°C and using tungsten hexafluoride as a starting material.

19. The method according to claim 10, which comprises:

forming a tungsten-containing layer from a material selected from the group consisting of tungsten nitride, tungsten silicide, and pure tungsten; and

producing the dielectric layer from the tungsten-containing layer.